

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 10/050,573
Attorney Docket No.: Q66582

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A charge read-out method, comprising:

moving charges into a plurality of charge transfer paths disposed on both sides along a row of a plurality of light receiving units arranged linearly, the charges being generated and stored in the plurality of light receiving units having received light; and

transferring and outputting the moved charges along the light-receiving-charge transfer paths disposed on both sides of the plurality of light receiving-unit units,

wherein each of the plurality of light receiving units is connected to a light receiving path on each side to permit the charges to exit from both sides of the light receiving units.

2. (previously presented): A solid-state imaging device, comprising:

a plurality of light receiving units arranged linearly for receiving light to generate and store charges;

a plurality of charge transfer paths disposed on both sides of said plurality of light receiving units for receiving the charges exiting from said plurality of light receiving units and for transferring and outputting the received charges;

a controller for moving the charges stored in said plurality of light receiving units into said plurality of charge transfer paths, and for transferring and outputting the charges moved into

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said plurality of charge transfer paths disposed on both sides of said plurality of light receiving units.

3. (previously presented): A solid-state imaging device comprising:

a plurality of light receiving units arranged linearly for receiving light to generate and store charges;

a plurality of charge transfer paths disposed on both sides of said plurality of light receiving units for receiving the charges exiting from said plurality of light receiving units and for transferring and outputting the received charges;

a controller for moving the charges stored in said plurality of light receiving units into said plurality of charge transfer paths, and for transferring and outputting the charges moved into said plurality of charge transfer paths disposed on both sides of said plurality of light receiving units,

wherein each of said plurality of light receiving units includes a plurality of segments separated by a potential barrier so that charges stored in said plurality of light receiving units are moved to said plurality of charge transfer paths.

4. (original): The solid-state imaging device according to claim 3, wherein the plurality of segments are four segments obtained by separating each of said plurality of light receiving units with a cruciform potential barrier.

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5. (currently amended): The charge read-out method according to claim 1, wherein each of the plurality of light receiving units is connected to a light receiving path on at least two sides to permit the charges to exit from both sides of the light receiving unit and wherein each light receiving unit is a single, integrally formed, storage container for storing the generated charges.

6. (currently amended): The solid-state imaging device according to claim 2, wherein each of the plurality of light receiving units is directly connected to at least two transmission gates, and wherein each of the two transmission gates facilitates transmission of the charge from its respective light receiving unit to a charge transfer path, and wherein each light receiving unit is a single, integrally formed, storage container for the received charges.

7. (previously presented): The solid-state imaging device according to claim 2, wherein the charges from a light receiving unit of the plurality of light receiving units exit the light receiving unit on both sides and are transmitted to a respective charge transfer path from the plurality of charge transfer paths.

8. (previously presented): The solid-state imaging device according to claim 3, wherein the barrier comprises: a first conductive impurity layer and a second conductive impurity layer selectively formed on top of the first conductive impurity layer, the second conductive impurity layer has a surface covered with a first conductive high density layer in a light receiving unit

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from the plurality of light receiving units, and wherein the second conductive impurity layer or the first conductive impurity layer is of relative low density.

9. (previously presented): The solid-state imaging device according to claim 3, wherein the barrier comprises a PNP structure formed on a p-substrate.

10. (previously presented): The solid-state imaging device according to claim 3, wherein the barrier is provided without impeding photoelectric conversion of its respective light receiving unit.

11. (previously presented): The solid-state imaging device according to claim 3, wherein the segments separated by the potential barrier are triangularly shaped.

12. (previously presented): The solid-state imaging device according to claim 3, wherein the potential barrier diagonally divides a light receiving unit from the plurality of light receiving units into segments.

13. (new): The charge read-out method according to claim 5, wherein said each light receiving unit stores the generated charges for a single pixel.

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14. (new): The solid-state imaging device according to claim 6, wherein said each light receiving unit stores the generated charges for a single pixel.

15. (new): The solid-state imaging device according to claim 3, wherein the plurality of charge transfer paths are vertical paths disposed on both sides of each of said plurality of light receiving units, and wherein charges exiting from each of said plurality of light receiving units are received by charge transfers paths on both sides of a respective light receiving unit.

16. (new): The solid-state imaging device according to claim 3, wherein said each light receiving unit stores the generated charges for a single pixel and wherein said each light receiving unit has at least two exits for the charges.

17. (new): The solid-state imaging device according to claim 16, wherein each of the at least two exits is connected to a separate charge transfer path of said plurality of charge transfer paths.